

CLAIMS

What is claimed is:

- 5 1. A method for forming a fuel cell assembly, comprising the steps of:
a) forming a plurality of fuel cell sub-assembly modules, each containing a plurality of bonded together fuel cell units; and
b) joining together said plurality of sub-assembly modules to form said fuel cell assembly.
- 10 2. A method in accordance with Claim 1 wherein said forming step is followed by a step of testing each of said sub-assembly modules.
- 15 3. A method in accordance with Claim 1 wherein each of said sub-assembly modules comprises a plurality of bipolar plates assemblies interspersed with a plurality of membrane electrode assembly elements.
- 20 4. A method in accordance with Claim 1 wherein said forming step for each of said sub-assembly modules includes the steps of:
a) providing an assembly fixture having at least one alignment element for receiving fuel cell components:
b) selecting $n+1$ number of bipolar plate assemblies and n number of membrane electrode assembly elements, each bipolar plate assembly having an anode and a cathode, wherein n is the number of said plurality of fuel cell units desired in said sub-assembly module;
25 c) providing an elastomeric gasket on one of said anode and cathode of $n+1$ bipolar plate assemblies;

d) providing a gasketing element on the other of said anode and said cathode of **n+1** bipolar plate assemblies, at least one of said elastomeric gasket and said gasketing element including a curable liquid rubber material;

e) installing onto said assembly fixture one of said **n+1** bipolar plate assemblies,
5 said alignment element engaging said one of said **n+1** bipolar plate assemblies;

f) installing onto said assembly fixture a membrane electrode assembly element into contact with said just-installed bipolar plate assembly;

g) installing onto said assembly fixture another of said **n+1** bipolar plate assemblies, the anode of said one or said another of said **n+1** bipolar plate assemblies
10 being disposed adjacent said cathode of the other of said one or said another of said **n+1** bipolar plate assemblies, and said alignment element engaging said bipolar plate assembly being installed;

h) repeating steps f) and g) for the remaining number of provided bipolar plate assemblies and provided MEA elements to form a stack of **n** fuel cell units;

15 i) applying compressive force to said stack of **n** fuel cell units whilst curing said curable liquid rubber material of said at least one of said elastomeric gasket and said gasketing element to form a fuel cell sub-assembly module.

5. A method in accordance with Claim 4 wherein at least one of said
20 elastomeric gasket and said gasketing element is cured prior to said method.

6. A method in accordance with Claim 4 wherein neither of said elastomeric gasket and said gasketing element is cured prior to said method.

25 7. A method in accordance with Claim 4 wherein said elastomeric gasket includes a sealant that is liquid during said bipolar plate installing step.

8. A method in accordance with Claim 4 wherein said gasketing element includes a sealant that is liquid during said bipolar plate installing step.

9. A method in accordance with Claim 4 wherein at least one of said membrane electrode assemblies includes gas diffusion layers.

5 10. A fuel cell sub-assembly module including n fuel cell units, comprising $n+1$ bipolar plate assemblies and n membrane electrode assemblies.

11. A fuel cell assembly including a plurality of fuel cell sub-assembly modules.

10 12. A fuel cell assembly in accordance with Claim 11 wherein each of said sub-assembly modules is tested prior to its inclusion in said fuel cell assembly.

15 13. A fuel cell assembly in accordance with Claim 11 wherein said plurality of fuel cell sub-assembly modules are joined together by at least one gasketing element consisting of a curable liquid rubber material.